Race, ethnicity and birth-weight: Hawaii 1983 to 1986

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A study of racial/ethnic-specific mean infant birth-weights reported on 1968 to 1972 live birth-weight certificates for Oahu, Hawaii is reviewed here. The 1983 to 1986 data confirm those earlier results: (a) The Hawaiian group is significantly heavier in mean birth-weights than other cohorts during the preterm period (33 to 36 weeks gestational age); (b) statistically significant differences also were present in mean birth-weights for the term and post-term periods (37 to 45 weeks gestational age); and (c) the ranking of cohorts from heaviest to lightest in mean birth-weights is Caucasian, Hawaiian, Japanese and Filipino respectively. The data raises 2 questions: (1) Which birth-weight standards are most applicable for Asian and Pacific Islanders; and (2) what are the implications of the race/ethnic-specific mean birth-weight differences relative to mortality, morbidity and developmental outcome?

The question of racial/ethnic (R/E)-specific differences in birth-weight and the implications for R/E-specific infant mortality and morbidity is a clinically important problem relative to Hawaii's diverse population[1]. A number of studies have examined R/E-specific birth-weights for Asian and Pacific Island groups.

Connor et al[2], based on single births in 1952 to 1953 in Hawaii, reported the following order of median birth-weights in grams: Caucasians 3,364, Part-Hawaiian 3,305, Korean 3,276, Hawaiian 3,272, Puerto Rican 3,239, Chinese 3,238, Japanese 3,220 and Filipino 3,117.

Morton et al[3] examined the genetic effects of outcrossing on first generation hybrids in the State of Hawaii for the years 1958 to 1966. Relative to mean birth-weights, their results showed that both Caucasians and Hawaiians had the heaviest infants and Japanese and Puerto Ricans had the lightest.

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Mean birth-weights in a series of single, liveborn, Chinese babies from Taiwan were compared with a series of white American babies by Lin and Emanuel[4]. The Chinese babies were clearly smaller than the white American babies. Although the intrauterine growth standards for American infants were expected to exceed those for Chinese infants, the gestational, age-specific birth-weights in the American series were within or below the confidence limits for the Chinese.

After controlling for the effects of 22 factors, Shiono et al[5] reported differences in birth-weights among Asians (as a group), blacks, Hispanics and white groups in California. In comparison with whites, they estimated the relative mean differences in birth-weight as -246g in blacks, -210g in Asians, as a group, -105g in Hispanics and -140g in all others.

Purpose

Preliminary, exploratory, statistical comparisons of birth-weights recorded on live birth certificates for the island of Oahu, State of Hawaii, for the years 1968 to 1972 have led to several substantive exploratory hypotheses. The 1968 to 1972 data were based on: (a) Single births of at least 500g infants and (b) gestational ages between 24 and 46 weeks. Parental R/E was self-reported at the time of birth with only one R/E-designation permitted. The reported R/E of the mother was classified into 4 groups: Caucasian (N=18,756), Filipino (N=5,856), Hawaiian (N=7,524) and Japanese (N=6,802). Not included in any analyses were the Chinese, who constituted too small a sample for intensive analysis, and the "others" who represented too diverse a population.

The exploratory hypotheses revealed significant R/E-specific mean birth-weight differences throughout the gestational period of 24 to 46 weeks: Hawaiian and Japanese in the late prenatal period, and Caucasian and Filipino in the term and post-term periods, had heavier and lighter babies, respectively.

Our present study evaluates the previously developed hypotheses as compared with State of Hawaii 1983 to 1986 live birth certificate data. Hypothesis I: The birth-weights of Caucasian, Filipino and Japanese newborns statistically are different for gestational ages during the preterm period of 24 to 36 weeks.

Hypothesis II: The birth-weights of Caucasian, Filipino and Japanese newborns are statistically different for each gestational age during the term (37 to 41 weeks) and post-term (4 to 46 weeks) periods. Specifically, the Caucasian newborns are statistically larger than Filipino and Japanese newborns, but there is no statistical difference between the Filipino and Japanese newborns.

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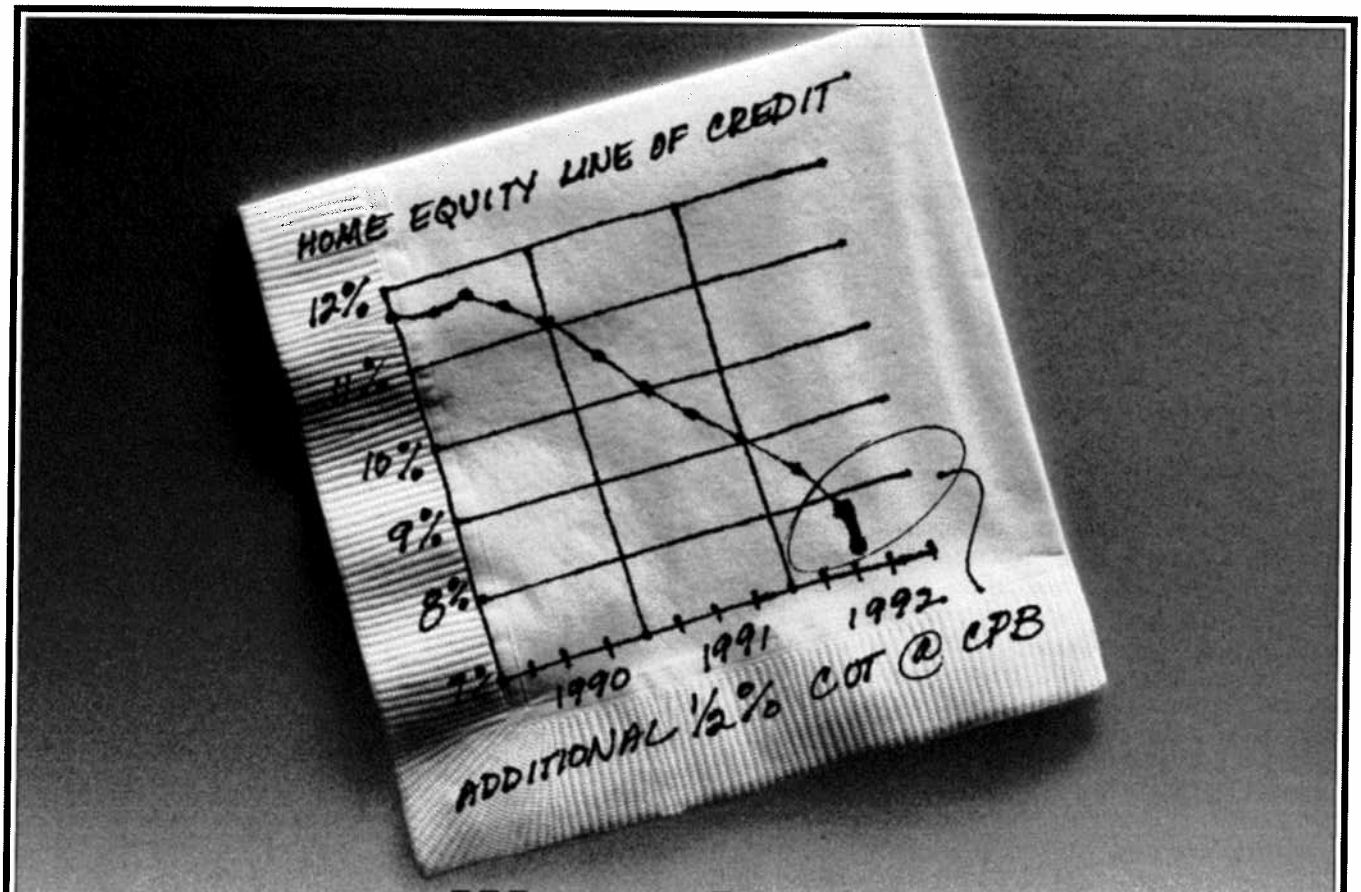

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Methods

Design

The design was a retrospective, comparative, population analysis of the effect of maternal R/E on the birth-weight of infants.

Subjects

The study cohorts which conformed to the earlier set of requirements were Caucasian (N=15,978), Filipino (N=7,959), Hawaiian (N=9,856) and Japanese (N=7,052).

Procedure

The classified and coded variables taken from each birth certificate are shown in Table 1. Two calculated variables were parity and the socioeconomic status of the mother's census tract of residence (SESMCT). Parity was defined as the number of live births and was calculated based on the children previously born and still alive, plus previously born alive but now dead plus the current delivery. The SESMCT was computed by the use of Wegner's[7] formula: SESMCT = ((Education z score + Income z score)/2) X 3 + 10. All of these variables were used in the analyses as possible extraneous determinants of variations in the dependent variable birth-weight.

Analysis

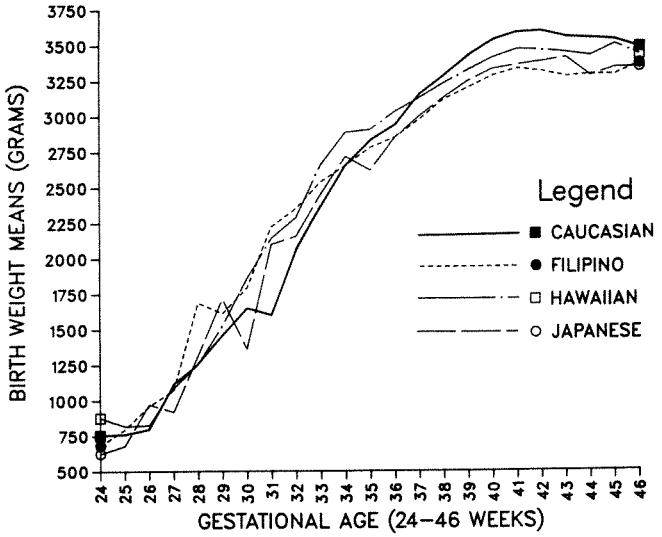
The percent birth-weight of Filipino mean birth-weights relative to Caucasian, Hawaiian and Japanese mean birthweights was calculated.

Gestational age-specific, step-wise multiple regression analysis was performed with each of the 4 R/E groups to determine the effect of the birth certificate variables on weight at birth. This approach, though different from that used in the former study, was (a) considered more likely to detect the effects of any confounding variables linked to an individual R/E cohort, and (b) as a result, the variable also was evaluated relative to the total group. A variable was considered to have a significant effect on birth-weight if its regression coefficient was statistically significant ($p<0.05$) and explained at least 20% of the variance of birth-weight, (partial $R^2 0.20$).

All variables having a significant effect on birth-weight in each R/E cohort were employed as a set of covariates in an analysis of covariance[8] procedure to isolate the effect of maternal R/E on the birth-weight of the infant. For the gestational ages where the regression procedure produced no significant covariates, an analysis of variance procedure was used. When the 2 procedures indicated a significant difference in birth-weight among the maternal R/E groups, the Duncan Multiple Range Test was used to detect the individual group differences in birth-weights. All calculations were performed using the preprogrammed computerized Statistical Analysis Procedures (SAS)[9].

TABLE 1. Classified and Coded Variable[6]

1	Birth Weight	(BIRTHWT)
2	Complication of Pregnancy	(COMPREG)
3	Congenital Anomaly	(CONANOM1)
4	Condition on illness that affects the current pregnancy	(CONILLNS)
5	Father's Age	(DADAGE)
6	Date of Birth (year)	(DOBYR)
7	Education of Father	(EDUCDAD)
8	Education of Mother	(EDUCMOM)
9	Gestational Age	(GESTAGE)
10	Legitimacy	(LEGTMACY)
11	Mother's Age	(MOMAGE)
12	Month Prenatal Care began	(MOPNATAL)
13	Mother's Place of Residence (census tract)	(MPORCT)
14	Father's Race	(RACEDAD)
15	Mother's Race	(RACEMOM)
16	Total Number of Prenatal Visits	(TOTNOPNV)
17	Previous Delivery Born Alive	(PRDBALIV)
18	Previous Delivery Born Alive Now Dead	(PRDBALDE)



Results

Filipino infants of gestational age of≤33 weeks generally have a larger mean birth-weight than Caucasian infants. For a gestational age ≤5 weeks the converse is true. Hawaiian mean birth-weights appear to be generally larger than Filipino mean birth-weights throughout the late prenatal gestational period. The Japanese mean birth-weights fluctuated; they appeared to be slightly lower at 24 to 33 weeks and then were comparable to the Filipino weight levels at 34 to 46 weeks.

The covariance and variance procedures described above indicated that the observed differences in mean birth-weights among the 4 groups were statistically significant at 28 weeks gestational age and at every gestational age ≤33 weeks (Figure 1). (The results of the Duncan Multiple Range Test are available on request from the authors, as well as the R/E and gestational age-specific, mean birth-weight data.)

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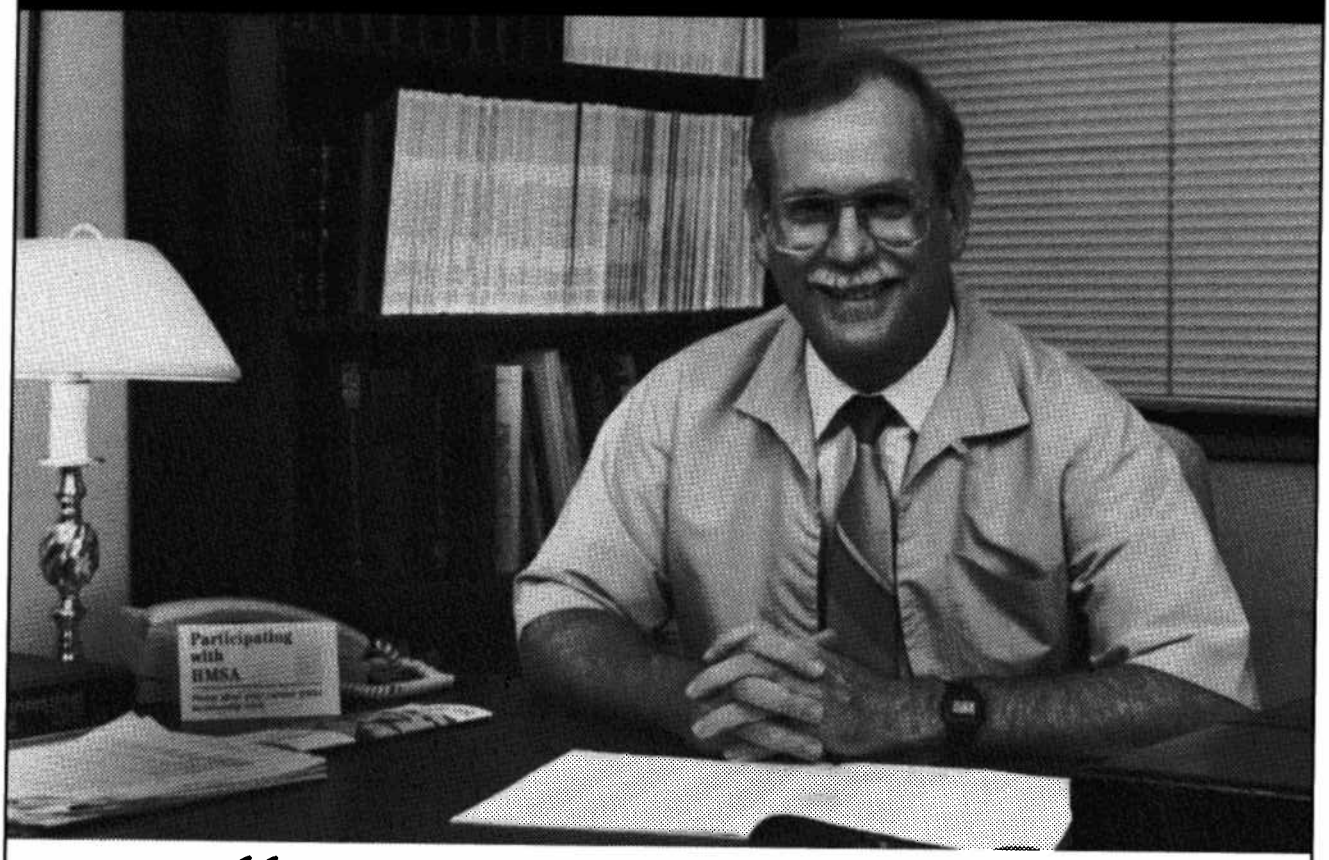

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Discussion

This systematic replication confirms the R/E-specific birth-weight differences previously reported from 1968 to 1972 live birth certificates. The significantly greater mean birth-weight at 28 weeks in the Filipino cohort is in line with the earlier observation. Likewise, the Hawaiian cohort is significantly heavier for gestational ages 34 to 36 weeks. In light of these findings, Hypothesis I is accepted.

The emergence of a splitting factor at about 36 weeks of gestational age also clearly identifies dominant R/E group differences. The term and post-term results confirm the early results and therefore, Hypothesis II is also accepted. In terms of statistically significant differences the cohort ranking from heaviest to lightest mean birth-weight weights is Caucasian, Hawaiian, Japanese and Filipino.

As in the 1968 to 1972 exploratory study, the analyses controlled for most of the known multifactorial determinants which are associated with variations in birth-weight[10]. In accepting the clear demarcation of R/E differences in birthweight, there are several extenuating factors which must be evaluated: First, the possibility of errors related to calculations of gestational age and measurements of weights at the time of birth, as well as factors associated with inclusion/exclusions in the newborn samples; second, the reliability of self-reported parental R/E identity; third, the lack of data on maternal size, weight-gain during pregnancy and substance abuse.

These are all variables with a definite impact on birthweight and are not recorded on the birth certificate. The effect of weight-gain during pregnancy on birth-weight in this population cannot be estimated. The use of tobacco and alcohol by the mother, as well as inadequate nutrition, have been shown to have a detrimental effect on birth-weight of the infant[12,13,14,15]. Hatch and Bracken[15] state that studies on the use of marijuana by the mother have been inconclusive. Cocaine use by the mother has been shown statistically to reduce the birth-weight of the infant[16]. Shiono et al[5] concluded that factors such as maternal smoking and alcohol use during pregnancy, the sex of the child and maternal weight-for-height percentile were "insufficient" to explain their recorded R/E differences. With reference to the data at hand, McLaughlin et al report that Caucasians and Hawaiians have a significantly higher rate of drug use than Filipino and Japanese mothers. This leads to the conjecture that the observed differences in mean birth-weights, especially during the preterm period, might be even greater if drug use was an extraneous variable in the analysis.

Conclusion

In conclusion, the result of these analyses of certificates of live births in Caucasian, Filipino, Hawaiian and Japanese groups raises 2 important questions for future research: (1) What birth-weight standards are most applicable for Asian and Pacific Islanders; and (2) what are the implications of the R/E-specific mean birth-weight differences relative to mortality, morbidity, and developmental outcome?

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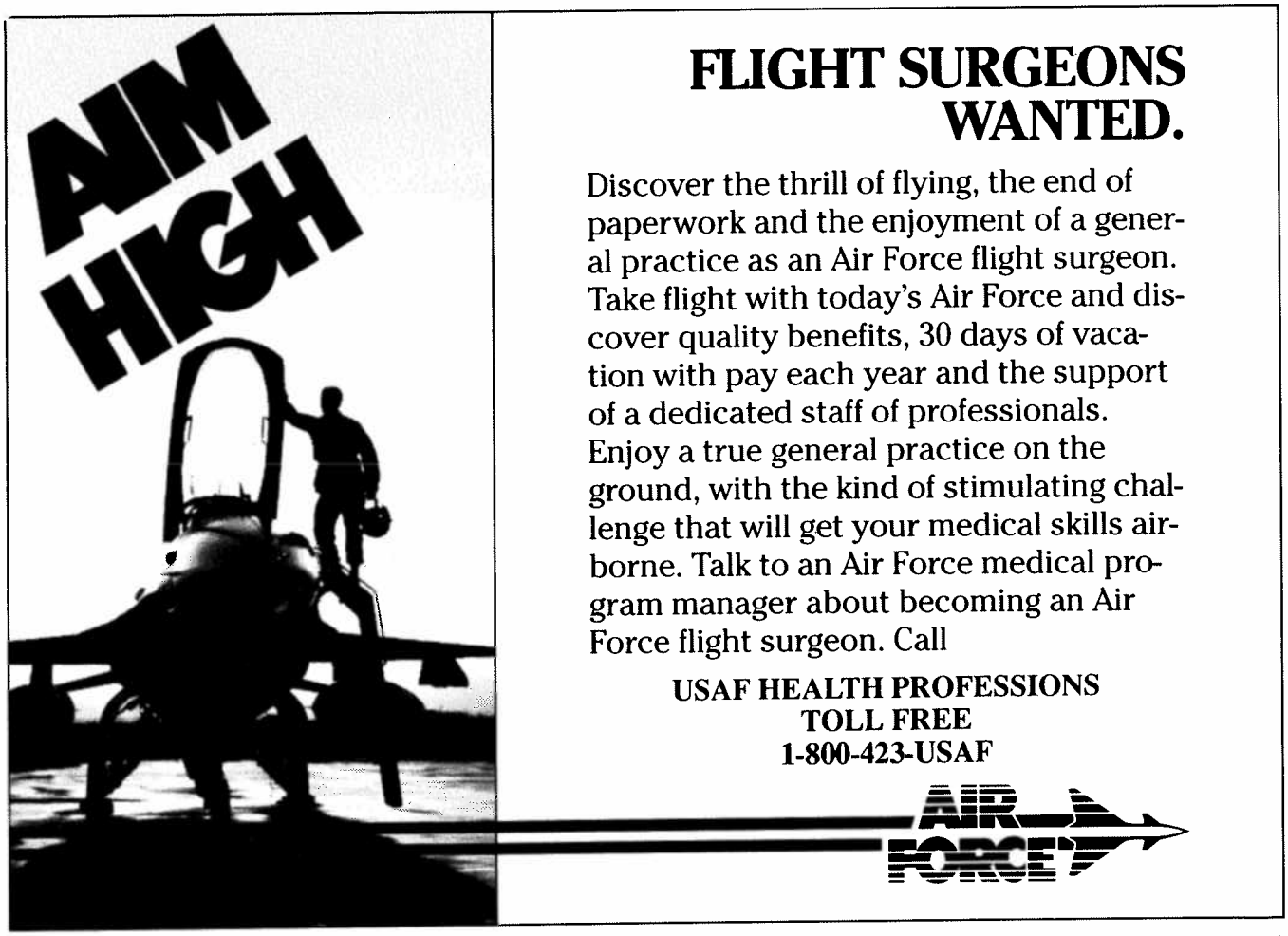

Prescription drugs for the indigent

The Pharmaceutical Manufacturer's Association has come out with a 1992 Directory of the Prescription Drug Indigent Programs. This Directory is available free to every practicing physician— particularly to those in Hawaii who see DHS clients, those under SHIP and any of the poor, the near-poor, the under- and the uninsured patients. It is also free for the asking by all medical facilities. It can be obtained from your visiting drug reps or from the PMA, 1100 15th St NW, Washington DC 20005.

There is no better way to introduce it to your attention than to reproduce herewith its "Introduction":

> The research-based pharmaceutical industry has had a long-standing tradition of providing prescription medicines free of charge to physicians whose patients might not otherwise have access to necessary medicines.
>
> To make it easier for physicians to identify the growing number of programs available for needy patients, the Pharmaceutical Manufacturers Association has created a pilot program consisting of two components:
>
> • This directory lists 59 prescription drug indigent programs that are provided by our member companies. The programs are listed alphabetically by company. Under the entry for each program is information about how to make a request for assistance, what prescription medicines are covered and some basic eligibility criteria.
>
> • Physicians will also be able to obtain up-to-date information for using a toll-free PMA hotline:
>
> 1-800-PMA-INFO
>
> When physicians provide the operator with the name of the prescription medicine they require, the operator will refer the physicians to the appropriate company programs.
>
> While these programs of America's pharmaceutical research companies are an indispensable safety net for the neediest patients, they cannot be expected to solve the larger national problem of access to medical care, including prescription drugs. The pharmaceutical industry will continue to work cooperatively with those seeking public and private sector solutions to these larger problems.

This is an impressive effort on the part of 59 PMA members. We have scanned the booklet and have noted that many of the more commonly used prescription drugs are listed under their maker's name.

There has been some criticism directed at the requirement that each manufacturer must be contacted through an 800 number individually; calls to the PMA will refer the caller to contact the particular drug company. This is quite understandable because each manufacturer has specific instructions that vary greatly one from the other.

We note with pleasure and commend two companies: (1) Smithkline Beacham Pharmaceuticals for its Indigent Patient Program that requires a bare minimum of eligiblity requirements; and (2) the Upjohn Company's program that is even less restrictive—in fact it allows the physician to do it all via its local drug rep!

We also have noted, with approval, that the person responsible in nearly all instances is the patient's physician. It may be an onerous task—some of the social work can be delegated to staff, of course—but the responsibility is the PMD's. This approach is a compliment to the physician's status as the patient's advocate.

Our emphasis on a minimum of restrictions with which the PMD must contend does not detract from the pharmaceutical companies' insistence on detailed information about the patient's real need for the medication, which the patient might otherwise not obtain, for a great number of reasons that are mostly the result of the inordinate cost of drugs these days. We are all aware, as practicing physicians, that prescribing a medication does not automatically mean the patient will get it filled, much less follow the instructions.

As professionals, we have an obligation not only to become aware of this noble action by the pharmaceutical industry and to make use of its programs, but also, as Marion Merrell Dow Inc states: "Physicians are encouraged to participate in the spirit of this partnership by also providing their services free of charge."

J I Frederick Reppun MD
Editor

RACE, ETHNICITY AND BIRTH-WEIGHT *(Continued from page 246)*

ACKNOWLEDGEMENTS

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(Continued on page 255) ➤

MAKA O KE KAUKA

(continued from page 253)

mine whether the injuries were adequately explained. When possible, take photographs before treatment is given, use color film and include the patient's face. If abuse is recognized, notify the appropriate social agency, and if the police are called, record the name of the investigating officer and any actions taken. Not rarely, when legal action ensues, the physician is likely to be the target of a negligence suit, so thorough medical records are essential.

Cupidity in sheep's clothing. Is it progress if a cannibal uses a fork?

Levamisole, a drug developed by Johnson & Johnson 30 years ago to treat farm animals, has been found to be effective medicine for human colon cancer. Annual cost today to treat a sheep, $14.95; annual cost to treat a human being (multiply by 100!)—$1,495. J&J claims it needs to recoup "tens of millions of dollars" it cost to prove the drug helps people. Yeah—right!!

Addenda.

▲ In some ancient cultures (like Maui today) mother's milk was used for eye infections.

▲ If H. Ross Perot were a doctor of medicine today, he would quit.

▲ A liberal is a person who tells others how to spend their money.

Aloha, and keep the faith.

rts

■

Erratum: Billion, not millions!

The AMA, with its vigorous Washington lobbying, its confrontation with HCFA, its orchestrated campaign to encourage physicians to directly contact politicians and HCFA (producing over 100,000 communications), succeeded in adding back $10 *billion* which Dr. Gail Wilensky and associates had cut from the Medicare budget.

RACE, ETHNICITY AND BIRTH-WEIGHT

(Continued from page 249)

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